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ORIGINAL PAPER

Young Friendship in HFASD and Typical Development: Friend Versus Non-friend Comparisons

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Abstract This study conducted comparative assessment of friendship in preschoolers with high-functioning autism spectrum disorder (HFASD, $n = 29$) versus preschoolers with typical development ($n = 30$), focusing on interactions with friends versus acquaintances. Groups were matched on SES, verbal/nonverbal MA, IQ, and CA. Multidimensional assessments included: mothers' and teachers' reports about friends' and friendship characteristics and observed individual and dyadic behaviors throughout interactions with friends versus non-friends during construction, drawing, and free-play situations. Findings revealed group differences in peer interaction favoring the typical development group, thus supporting the neuropsychological profile of HFASD. However, both groups' interactions with friends surpassed interactions with acquaintances on several key socio-communicative and intersubjective capabilities, thus suggesting that friendship may contribute to enhancement and practice of social interaction in HFASD.

Keywords High-functioning children with autism spectrum disorder (ASD) · Preschool · Friendship · Dyads · Peer relations · Peer interaction

Introduction

The current study aimed to comprehensively identify and characterize early friendship in preschoolers with high-functioning autism spectrum disorder (HFASD). We investigated the individual and dyadic quality of friendship in comparison to the quality of non-friend peer interactions in various social situations for preschoolers with HFASD versus those with typical development.

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Friendship in Young Children with Typical Development

The power of friendship and its importance for children's development has been well established in the empirical literature. In particular, having friends was found to be cardinal for children's emotional well-being and was identified as playing a protective role against peer rejection and victimization [see reviews in Vitaro et al. (2009) and Engle et al. (2011)]. For example, research has shown that the number of years during which typically developing early adolescents lacked at least one reciprocal friendship (between 6 and 13 years) predicted their emotional maladjustment symptoms such as loneliness and depression (Pedersen et al. 2007). Another study showed that having meaningful friends in kindergarten was associated later with better social skills in first- and third-grade boys (Engle et al. 2011). Having friends is also important to other aspects of social and emotional development in typical children. Through friendship, children develop and practice fundamental prosocial behaviors including mutual caring, companionship, and empathy (e.g., Barry and Wentzel 2006). Moreover, friendship forms a context in which to experience and develop emotion regulation, resiliency, and conflict resolution (Dunn 2004; Myers et al. 2013), as well as growth in social and interpersonal understanding (Dunn 2004).

Early friendship research is strongly based on observation of children's behaviors and on parents' and teachers' reports, which tend to show fine overlap. Young children's own reports are seldom tapped due to their limited verbal

skills. Researchers who investigated friendship in typically developing young children during toddlerhood, preschool, and early childhood have argued that such friendships: (a) are durable ranging from a minimum of 6 months to 2 years in duration and sometimes even longer (e.g., Dunn 1993; Dunn et al. 2002; Howes 1983); (b) tend to provide emotional support at times of distress and discomfort, such as in transitional periods from daycare to daycare or from preschool to kindergarten (e.g., Dunn 1993; Howes 1983); (c) are based on mutual affection that denotes closeness (Howes 1983); and (d) are used as a context for self-disclosure and for developing intimacy and trust, mainly through pretend play (Dunn 2004; Howes 2009; Howes et al. 1992).

To enable systematic measurement of friendship through direct observations, its main functions have been operationally defined to include functions such as companionship, affective-bonding and closeness, intimacy, and trust. *Companionship* has been operationally defined as both proximity preference and as having fun while involved in complementary and reciprocal social interaction (e.g., "playing together" or "doing things together"). Research has pinpointed companionship as a function of early friendship, more than other functions like intimacy and affection [see extensive review in Howes (1996)]. *Closeness-affection* was operationally defined (e.g., Dunn 2004; Howes 1996) as mutual liking and a sense of "specialness" and exclusiveness, which are expressed through verbal and nonverbal behaviors that denote affect and caring (e.g., partners smile or laugh while looking at one another in an ongoing activity).

Intimacy and trust were conceptualized in early friendship as the sense of emotional support, where friends feel they can rely on each other at times of stress and discomfort. Also, intimacy refers to the *sharing* of experiences, feelings, and opinions but is conceptualized as manifesting differently at early ages, when intimacy is explored mainly through pretend play rather than through verbal self-disclosure as seen in older children and adolescents. Through pretend play, children disclose their fears and concerns; thus, through this expression and the acceptance or rejection of their concerns by their peers, children build trust and establish bonding (Dunn 2004; Howes 1996; Howes et al. 1992). To a lesser degree, but still notably, children in early friendship also share their feelings, knowledge, and attitudes through gossiping with each other (Dunn 2004). Researchers of younger children's friendship have concluded that, with development, changes occur in the behavior markers and forms of friendship that are linked to children's social-emotional and cognitive development (e.g., pretend play expresses intimacy in preschool, whereas self-disclosure expresses the same function in adolescence); yet, it is assumed that the function and constructs of friendship (e.g., intimacy, closeness) remain stable.

Friends' Versus Non-friends' Interactions

The comparison of friends with non-friends can help pinpoint the unique, defining characteristics of friendship. Observational studies of behavioral manifestations of friendship in typically developing children have consistently indicated that friends display a higher level of mutual social engagement and responsiveness towards one another than do acquaintances (e.g., Dunn et al. 2002; Ladd et al. 1996; Newcomb and Bagwell 1995). In particular, friends exhibit a higher level of active involvement when jointly performing a task (Field et al. 1992); greater affective interchange in social play, as evidenced by more shared laughter and more mutual smiling, exclamations, and touching (Field et al. 1992; Foot et al. 1977; Newcomb and Brady 1982); more reciprocal verbal exchanges and coordinated actions (Brachfield-Child and Schiavo 1990; Newcomb and Brady 1982); a higher likelihood of assisting one another, for example by jointly manipulating the same materials to accomplish a task (Newcomb and Brady 1982); higher and more complex levels of social interaction, such as implementing more effective forms of conflict management with friends, a higher frequency of negotiating to reach a solution, and staying in close proximity more often even after dispute (e.g., Dunn and Cutting 1999; Dunn et al. 2002; Hartup et al. 1988); and more complex forms of social and social pretend play (e.g., Brachfield-Child and Schiavo 1990; Howes et al. 1994; Ladd et al. 1996; Newcomb and Bagwell 1995).

Friendship in HFASD

ASD is a neurobiological disorder that significantly impairs children's social-communicational capabilities and behaviors (*DSM-V*, American Psychiatric Association 2013). Both historical conceptualizations (Kanner 1943) and current diagnostic characteristics (*DSM-V*, 2013) of ASD highlight major difficulties in forming affective bonding, mainly with peers in the form of friendship. Indeed, children and adolescents with ASD engage more frequently in social activities with parents and other adults than with peers (e.g., Orsmond and Kuo 2011; Solish et al. 2010). Consistent findings based on various methodologies (e.g., parent or self-reports, social network paradigms) have shown that fewer children with ASD have friends than their counterparts with typical development (with studies citing 8–44 %) and that those children with ASD who do have friends have a lower number of friends (e.g., Chamberlain et al. 2007; Howlin et al. 2004; Kasari et al. 2011; Koning and Magill-Evans 2001; Locke et al. 2010; Mazurek and Kanne 2010; Orsmond et al. 2004; Rotheram-Fuller et al. 2010).

Cognitive functioning level of children with ASD also plays a factor: Children with higher IQs (over 85; i.e.,

HFASD) over a wide age range (ages 4–17 years, $M = 9.1$) were shown to have more friends than children with lower IQs (e.g., Mazurek and Kanne 2010). Moreover, the number of friends in ASD decreases with age: Adults have fewer friends than adolescents (e.g., Orsmond et al. 2004), and adolescents have fewer friends than children of elementary school age (e.g., Locke et al. 2010; Rotheram-Fuller et al. 2010). Rates for preschoolers have yet to be discovered. Church et al. (2000) reported that none of their participants with ASD between the ages of 3 and 5 years had a friend.

Failure to develop age-appropriate friendship is considers as a diagnostic characteristics for children with ASD (APA 2013). Although youngsters with HFASD reveal deficits in the major building blocks of friendship—intersubjective sharing, theory of mind, reciprocity, social interaction as in collaboration, conversation, and social play (Baron-Cohen 2000; Rogers and Pennington 1991; Tager-Flusberg 2001)—a recent body of research has reported that some children and adolescents with HFASD do demonstrate meaningful friendships. Researchers (e.g., Bauminger et al. 2008a, b; Bauminger and Shulman 2003; Daniel and Billingsley 2010; Howlin et al. 2004; Kasari et al. 2011; Orsmond et al. 2004; Locke et al. 2010) found these friendships to be durable (ranging between 6 months and 4 years), usually with same-age same-sex peers, and these friendships may develop with typical peers (i.e., mixed friendship) or with peers with HFASD (i.e., non-mixed friendship). Yet, these somewhat optimistic findings should be further examined to consider the quality of these friendship relationships—the extent to which they comprise meaningful, intimate, and close affective ties—in light of theories speculating on these children's reduced capacity for intersubjective sharing (e.g., Rogers and Pennington 1991).

In typical development, the effects of friendship on children's psychosocial development are closely linked to that friendship's quality (e.g., Vitaro et al. 2009). Quality of friendship in HFASD has not been frequently explored, but existing studies, using self-reports as well as observations of children's quality of interaction while playing with friends, have presented both similarities and differences compared with typical friendship. Based on self-reports of friendship functions among children from school-age to preadolescence, no differences emerged between children with HFASD and children with typical development in terms of their friendship's level of conflict, but the typical group reported significantly more intimacy, help, and companionship than the HFASD group (e.g., Bauminger and Kasari 2000; Bauminger et al. 2008b; Chamberlain et al. 2007), and the typical preadolescents also reported more affective closeness than their peers with HFASD (e.g., Bauminger et al. 2008b; Kasari et al. 2011). Adults with HFASD also reported less closeness, empathy, and support in their friendships compared to typical adults (e.g., Baron-Cohen and Wheelwright 2003; Jobe and White 2007).

Further support for the notion of lower friendship quality in children with HFASD than in typical development has been provided by observations of preadolescents' social interactions with a friend in two different, non-competitive play activities: building with blocks and drawing (e.g., Bauminger et al. 2008b). Results demonstrated poorer cooperative skills, less positive affect, and less skillful conversational skills, as well as a more rigid conversation style in the HFASD versus the typical groups. Play behaviors and complexity (coded only for the building activity) also differed, where children with HFASD exhibited a higher frequency of mere parallel play and a lower frequency of effective play than age-mates with typical development. Dyadic interactions of a child with HFASD were less socially oriented, cohesive, harmonious, and responsive, as well as less enjoyable and close.

All these differences support clinical as well as theoretical perspectives on friendship as a challenging social relationship for the child with HFASD. However, similarities between HFASD and typical friendship dyads have also been observed regarding several complex social behaviors such as the incidence of prosocial behaviors and eye contact with a smile, possibly suggesting that friendship may nonetheless offer an advantageous framework for enhancing social skills among children with HFASD (e.g., Bauminger et al. 2008b). Thus, to fully understand friendship nature and its developmental significance in HFASD necessitates a critical comparison between children's interactions with friends and with non-friends (i.e., acquaintances). Only such a comparison can demonstrate the differential role of a friendship as a possibly advantageous framework where children with HFASD may develop and experience affective and intimate ties with peers. If, indeed, relationships with friends are advantageous for these children, then interactions with a friend should surpass interactions with a non-friend in terms of social complexity and dyadic affective closeness.

Purpose of Current Study

The present study aimed to identify preschoolers with HFASD who have friends and to comprehensively describe the nature of these young friendships by comparing them to preschoolers with typical development, and by comparing interactions with a friend versus with a non-friend (acquaintance). The process of friends' identification (described below in the Participants section) yielded children with HFASD who had a friend with typical development (mixed friendship) and others who had a friend with HFASD (non-mixed friendship); thus, we also looked

at the quality of interactions within the HFASD sample by comparing interactions of non-mixed versus mixed dyads.

To elicit a wide range of possible friendship behaviors over a significant time period during different activities, we observed preschoolers in different noncompetitive social situations—a semi-structured shared construction game, a semi-structured shared drawing task, and different spontaneous free-play interactions. More specifically, we aimed to explore:

1. The two diagnostic groups' (HFASD/typical) differences and similarities in friend characteristics (e.g., age, sex) and friendship characteristics (e.g., duration—friendship's length, stability—friendship's consistency, meeting location).
2. Differences in observed friendship manifestations in terms of the individual target children's behavior by Group (HFASD/typical development), Relationship (friend/non-friend), and Situation (shared construction/shared drawing/free-play).
3. Differences in observed friendship manifestations in terms of the dyadic dimensions by Group (HFASD/typical development), Relationship (friend/non-friend), and Situation (shared construction/shared drawing/free-play).
4. Within-group examination in HFASD of the differences in manifestations of friendship behaviors between mixed interactions (with a typical peer) and non-mixed interactions (with a peer with HFASD) by Relationship (friend/non-friend).

This study aimed to contribute uniquely to narrowing gaps in the literature by identifying and characterizing the nature of early friendship in HFASD and by providing a comparative description of such friendships versus non-friend peer interactions in this population, thus sharpening our clinical understanding of these young children's ability to form affective bonds and pointing to the possible developmental advantages of friendship relationships for these preschoolers. Based on the existing literature in both typical development and HFASD, we expected to find differences in the target children's friendship behaviors and the dyads' friendship quality, in favor of the dyads with a typically developing target child over dyads with a target child with HFASD, and in favor of the friend dyads over the non-friend dyads.

Method

Participants

A total of 177 preschoolers participated in the study. The 59 recruited research participants were divided into two groups of target children (with four girls in each group): the HFASD group ($n = 29$) and the typical development group ($n = 30$). The remaining participants comprised 59 preschool classmates who were identified as the target children's friends and 59 preschool classmates who were not the target children's friends.

Target HFASD Group (n = 29)

All participants with HFASD were previously diagnosed by licensed psychologists unassociated with the current study, based on the *DSM-IV-TR* (American Psychiatric Association 2000). Clinical diagnoses were: PDD-NOS (4 %; $n = 2$), HFASD (37 %; $n = 10$), and Asperger syndrome (59 %; $n = 17$). All 29 children met criteria for autism on the autism diagnostic interview-revised (ADI-R; Lord et al. 1994), which parents completed for the current study to verify diagnosis. To assess children's IQ and MA scores, the Mullen Scales of Early Learning (Mullen 1995) were administered to all target children, except for five children with ASD who came to the study with prior IQ scores based on recent testing from less than 1 year earlier using the Wechsler Intelligence Scale for Children-Revised (WISC-R95; Wechsler 1998) or the Wechsler Preschool and Primary Scale of Intelligence (WPPSI-III; Wechsler 2002). Only participants with an IQ of 80 or above were included, to denote high functioning along the autism spectrum.

School Settings and Exposure to Typical Peers

Children were recruited from 24 different preschools around Israel, all but one in urban areas. Due to the fact that the Israeli school system's public services for children with ASD are more comprehensive in self-contained classes than in inclusive settings, a large proportion of these children—including those with HFASD—attend self-contained classes. Recent data from the Israeli Ministry of Education (personal communication, November, 2013) indicated that in the 2012–2013 year 1,520 children with ASD (81.4 %) attended self-contained classes versus 347 children (18.6 %) in integrative settings, although the percentage of included children at the time of the current study was much lower. In these self-contained settings, part-time inclusion (1–3 times per week) in regular education is possible, accompanied by the educational team from the self-contained class, mainly in cases where there is close proximity between the two settings. Also, some of the integrative settings are called "inclusive kindergartens/preschools" where two thirds of the class consists of children with typical development ($\sim$20 children), and one third of the children have special needs/ASD ($\sim$10 children).

Accordingly, in the current study, the distribution of children with HFASD into educational settings was as

Table 1 Sample characteristics for high-functioning preschoolers with autism spectrum disorder (HFASD) and children with typical development

	HFASD ($n = 29$)		Typical ($n = 30$)		Group differences (t)
	M	SD	*M*	SD	
CA (in months)	59.45	11.07	55.30	10.97	1.45
Verbal MA	59.41	11.30	58.68	10.53	.25
Nonverbal MA	60.63	11.16	55.87	11.66	1.59
IQ	103.52	17.21	107.60	14.13	.99
Mothers' education	4.90	1.01	5.23	0.94	1.33

Verbal MA, nonverbal MA, and IQ scores are based on the Mullen Scales of Early Learning (or the Wechsler Scale for five children with HFASD). Mothers' education was calculated on a six-point scale: 1 = less than 8th grade; 2 = some high school; 3 = high school with diploma; 4 = some college; 5 = college degree (e.g., Bachelor's); 6 = graduate degree (e.g., Master's or above). All group differences were non-significant

follows: 15 children (51.7 %) attended self-contained classes with limited exposure to typical peers; 4 children (13.8 %) attended self-contained classes along with part-time inclusion in a regular education setting, thus having some exposure to both peers with typical development and with ASD; 4 children (13.8 %) attended inclusive kindergartens/preschools (2:3 ratio), with exposure to both typical and ASD peers; and 6 children (20.7 %) attended regular education classes, thus having exposure mainly to typical peers. This distribution pattern coincides with the distribution of the general HFASD population into the different settings at the time of the study.

Target Typical Development Group (n = 30)

This group was matched to the HFASD group (see Table 1) on maternal education, on CA, and on IQ, verbal MA (VMA), and nonverbal MA (NVMA), derived from the Mullen Scales.

Friends (n = 59)

For each of the 59 target children, a close friendship of at least 4 months' duration was identified from among the child's preschool classmates, according to reports by both the child's mother and preschool teacher. Parents and teachers were asked to nominate children with whom the target child showed mutual interest and then to pinpoint the best friend of the target child among those nominated, following the criteria identified by Howes (1996), which included: (1) mutual preference during spontaneous interaction along different activities (i.e., on playground); (2) demonstration of mutual interest; (3) maintenance of close proximity; (4) showing affection (eye contact and smile, touch); (5) shared fun; and (6) sharing objects during play. Only children who were identified as best friends to the target child by both the parent and the teacher were included in the study. Two children were not included in the study based on disagreement between the teacher and the parent.

Altogether, the process of friends' identification yielded 11 cases of mixed friendship (38 %) and 18 cases of non-mixed friendship (62 %). Among the mixed dyads, distribution according to school setting was: six dyads (54.5 %) in individual inclusion in regular classes; 3 dyads (27.3 %) in self-contained classes with part-time inclusion; and 2 dyads (18.2 %) in "inclusive kindergartens/preschools." Among the non-mixed dyads, 16 dyads (89 %) were from self-contained classes without part-time inclusion, and 2 dyads (11 %) were from "inclusive kindergartens/preschools."

Non-friends (n = 59)

For each of the 59 target children, the friend identified through the above procedure was matched by age and diagnostic status with a non-friend (defined using Howes's friendship criteria) from among the child's preschool classmates. That is, same-age non-friends with typical development were matched to the identified friends with typical development, and same-age non-friends with HFASD were matched to the identified friends with HFASD.

Measures

The current multidimensional assessment of friendship included observational measures of friendship manifestations and quality as well as mothers' and teachers' descriptions of children's friends and friendship characteristics.

Teacher and Mother Reports of Friend and Friendship Characteristics

Mothers and teachers were interviewed using a short version of the Early Childhood Friendship Survey for Parents and Caregivers (Buysse 1991), and they completed a brief demographic questionnaire. They were asked to describe children's friends and friendship characteristics as follows: friends' age in months; any disability of the friend; friendship's duration (in months); stability of friendship (yes/no); and meeting location (school only/school and home).

Friendship Observation Procedure: Two Relationship Types (Friend/Non-friend) and Three Social Situations (Construction/Drawing/Free-Play)

The 59 children in the two target groups (HFASD and typical development) each participated in two 40-min videotaped interactions in their preschools—on 1 day with

the identified friend and on another day with the identified non-friend, in counterbalanced sequence. Each dyad (with friend and with non-friend) participated in all three non-competitive situations, administered in counterbalanced order: construction game (15 min), shared drawing (15 min), and free-play (10 min).

Construction Game Situation This 15-min situation followed Siperstein et al. (1997) procedure for the assessment of behavioral manifestations and quality of friendship during task performance. This procedure was found successful for differentiating friendship behaviors in children with and without learning disabilities (Siperstein et al. 1997) and in children with HFASD versus with typical development (Bauminger et al. 2008b). In this situation, children received a noncompetitive age-appropriate construction game—Castle Marbleworks® by Discovery Toys. Children were asked to construct a shared design (a marble maze) by using adjusted track pieces to create pathways for dropping three weighted, chiming marbles down the track.

Shared Drawing Situation To assess a longer duration of interaction and provide children with a different activity option, children participated in another 15-min drawing situation based on Bauminger et al. (2008b). Children were given a box of colored markers, magazines, scissors, glue, and stencils and a large blank sheet of paper and were asked to draw a shared picture. This procedure was found successful for differentiating friendship behaviors in children with HFASD versus with typical development (Bauminger et al. 2008b).

Free-Play Situation To evaluate spontaneous interaction in a free-play social situation, children were given 10 min of free-play time and were provided with snacks and drinks. In addition, several age-appropriate toys were available to them in the room, such as means-end games, toys for pretend play, and fine-motor games like bead threading. Children were not given any specific instructions; they were just told that they could do whatever they felt like doing.

Friendship Observation Scale-Young (FOS-Y)

Trained observers coded the target children's videotaped interactions using the FOS-Y interactional coding system. The FOS system was designed to assess preschoolers' quality of interaction based on behaviors, verbalizations, and affects identified as indicators of friendship by previous research (e.g., Bauminger et al. 2008a, b; Howes 1996). For the purpose of the present study, we adapted the FOS-Y slightly to younger ages from the FOS scale, which was used in Bauminger et al. (2005) to evaluate friendship manifestations and quality of friends' relationships among preadolescents with HFASD and with typical development [see FOS scale details in Bauminger et al. (2008a)]. In the FOS-Y, to fit the young ages of the participants, we extended the play scale to include solitary and collaborative pretend play, and we extended the dyadic dimensions to include a category of co-engagement, as described below. The FOS-Y quantitatively assessed observed friendship manifestations with two areas of focus: (a) the target child's behavior (minute-by-minute positive social interaction and play scale) and (b) the quality of the dyadic dimensions (global evaluation scale).

Minute-by-Minute Friendship Manifestation Scale Measured for Target Child's Behavior: Positive Social Interaction and Play The 21-item positive social interaction and play scale consisted of seven main categories: (1) *cooperative behavior*, including behaviors directly related to the planning and performance of a task or activity; (2) *sharing behaviors* such as experiences or emotions, sharing objects, joint attention, and showing behaviors; (3) *prosocial behavior* such as comforting and helping; (4) *conversation*, as in small talk and negotiation; (5) *nonverbal interaction* such as the combination of eye gaze and a smile; (6) *positive affect*; and (7) *play*, which included four levels of play—parallel play, solitary pretend play (PP), social and coordinated play, and collaborative PP. Using the videotapes of the interactions, for each minute of the 40-min observation time (15 for construction, 15 for drawing, and 10 for free-play), the observers watched the target child's behaviors for 50 s and then, during the next 10 s, recorded behaviors from any of the seven categories (usually 2–3 items) that were most noticeable in the preceding 50-s interval. For each of the seven categories on the positive social interaction and play scale, we summed the percentages of intervals for which behaviors from that category were detected, separately for each of the situations. Thus, a higher score in a particular category indicated a higher frequency of positive social interactions and play for that category.

Global Evaluation Scale for Dyadic Interaction Quality Three categories of dyadic dimensions were rated globally for each of the three interactive situations (15-min construction, 15-min drawing, and 10-min free-play). *Affective closeness* tapped verbal and nonverbal expressions of affection, rated on a 5-point scale ranging from *Very few or no signs of closeness* to *Very close and intimate friendship* (5). *Shared fun* was rated on a 5-point scale ranging from *Not having fun at all from the social interaction* (1), to *Working on the task equaled the social interaction in importance* (3), to *Social interaction was more important than the task* (5). The *Co-engagement* scale

tapped the extent to which children took each other into consideration during their play and social tasks, including ToM attributes, rated on a 7-point scale ranging from *No mutual attributes at all* (1) to *Games and activities were mutually coordinated and children showed high consideration of each other during their activities* (7).

FOS-Y Coders Two blind observers who were master's students in special education, were trained to code the FOS-Y's positive social interaction and play scale and global dyadic evaluation, using videotapes of friendship dyads of children with HFAD and children with typical development who were not associated with the current project. For these videotapes, an inter-observer agreement level of 85 % or higher was obtained for all FOS-Y items. Coders then worked independently to code the current sample of videotapes, checking ongoing inter-rater reliability by jointly coding 25 % of the sample, randomly selected from both the HFASD and the typical development groups, obtaining an agreement level of 90 %.

Procedure

This study was part of a large project investigating socio-emotional aspects of preschoolers with HFASD and with TYP. Parents were contacted through their child's preschool teachers, after receiving permission from the Israeli Ministry of Education. After obtaining written parental consent for participation, we advised the parents and teachers about the nature of the research by telephone and interviewed them regarding the friendship status of the target child according to Howes's (1996) criteria. After the children were found eligible for the study, at least one parent of each child with ASD was interviewed using the ADI-R to confirm diagnosis.

Each target child attended three meetings for data collection. In the first meeting, the Mullen Scales were administered (for all but five children with HFASD who had recent IQ testing using a Wechsler scale). In the second and third meetings, the same 3-situation procedure was held twice, in the target child's classroom once with the identified friend and once with the identified non-friend, in counterbalanced order for situation and relationship. While children participated in the construction/drawing/free-play situations, the target child's mother and teacher completed the brief demographic questionnaire and the short friendship interview in another room.

Results

In this section, we report on: (a) the friends' and friendships' characteristics in HFASD and typical development based on mothers'/teachers' descriptions; and (b) assessment of observed friendship manifestations in terms of the target child's behavior and the dyadic dimensions, by Group (HFASD/typical development), Relationship (friend/non-friend), and Situation (construction/drawing/free-play) and in terms of the mixed interactions (with a typical peer) versus non-mixed interactions (with a peer with HFASD) by Relationship (friend/non-friend).

Friends' and Friendships' Characteristics: HFASD Versus Typical Groups

Target Children's Identified Friends

Based on mothers' and teachers' reports from the short friendship interview, the majority of children in both HFASD and typical target groups had same-age identified friends, with non-significant group differences using *t* test. Mean CA was 59.45 months (SD = 11.07) for the target children with HFASD and 62.00 months (SD = 11.18) for their identified friends. Mean CA was 55.30 months (SD = 10.97) for the target children with typical development and 55.00 months (SD = 11.32) for their identified friends. In addition, most target children had same-sex identified friends, with no significant group differences: 19 same-sex pairs (65.5 %) for the HFASD group and 22 same-sex pairs (73.3 %) for the typical group, $\chi^2 = .42$, $p > .05$.

Target Children's Friendship Characteristics

According to maternal reports, the two target groups (HFASD/typical) revealed a similar duration and stability of friendships. For both target groups, mothers reported friendship duration as ranging between 4 and 60 months ($M = 13.00$, SD = 13.80 for HFASD; $M = 18.60$, SD = 14.19 for typical development), with non-significant group differences using ANOVA. Likewise, most friendships in both groups were perceived by mothers as stable (79.3 %, $n = 23$ pairs for HFASD; 83 %, $n = 25$ pairs for typical development), with non-significant group differences using Chi square analysis. Teachers did not provide information on duration and stability for five children (two HFASD pairs, three typical pairs). Overall, teacher perceptions of stability resembled maternal perceptions (78 % stable, $n = 21$ pairs for HFASD; 89 % stable, $n = 24$ pairs for typical development, with non-significant χ^2). However, teachers reported shorter friendship duration than mothers, although teachers' reports indicated that both groups' friendships were still sufficiently lengthy to meet friendship criteria. Duration was reported by teachers as ranging from 4 to 19 months ($M = 9.29$, SD = 4.66) for children with HFASD and as ranging from 4 to 40 months

($M = 13.77$, SD = 9.55) for children with typical development, where the typical group's friendships were rated as significantly longer than the HFASD group's, F (52) = 4.79, $p < .05$.

In their interviews, mothers and teachers also reported the location of friends' meetings in both groups (preschool only or preschool and home). According to maternal reports, in both groups, the majority of pairs of friends met both at home and at the preschool, comprising 69.0 % of friendships in the HFASD group ($n = 20$ pairs) and 76.7 % of friendships in the typical group ($n = 23$ pairs), and the remainder met only at preschool, with no significant group differences (χ^2). Teachers provided a different picture about children's meeting places, reporting that 17 pairs (65.4 %) in the HFASD group met only at the preschool, versus only four pairs (13.7 %) in the typical group, $\chi^2 = 15.75$, $p < .001$.

Observed Friendship Manifestations in the Target Children and Dyads

Using the FOS-Y, we analyzed minute-by-minute categories for each individual target child's positive social interactions and play behaviors, and we analyzed the global evaluation of each dyad on the dimensions of closeness, shared fun, and co-engagement. We also analyzed the FOS-Y behavioral data to compare friendship manifestations in mixed versus non-mixed pairs.

Target Children's Positive Social Interactions

A 2 (Group: HFASD/typical) × 2 (Relationship: friend/non-friend) × 3 (Situation: construction/drawing/free-play) MANOVA with repeated measures on Relationship and Situation was computed to examine target children's differences on the following six FOS-Y positive social interaction categories: cooperative behaviors; sharing, prosocial behaviors, social conversation skills, nonverbal interaction, and positive affect. A significant main effect of Group emerged, F (6, 52) = 6.07, $p < .001$, $\eta^2 = .41$. As seen on Table 2, univariate ANOVAs revealed that the HFASD group showed a lower frequency of sharing, social conversation, and positive affect than the typical development group. A significant main effect of Relationship also emerged, F (6, 52) = 5.37, $p < .001$, $\eta^2 = .38$. Univariate ANOVAs revealed that children's interactions with a friend showed more frequent cooperative behaviors, sharing, and positive affect than interactions with a non-friend (see Table 2).

However, the MANOVA for the interaction of Relationship × Group neared significance, F (6, 52) = 2.12, $p = .067$, $\eta^2 = .20$. Due to our interest in Relationship (friend vs. non-friend) differences in specific positive social interaction behaviors, we executed further univariate analyses on the statistical interaction, which revealed significant interaction of Relationship × Group effects for cooperative behavior, F (1, 57) = 5.81, $p = .01$, $\eta^2 = .09$, sharing, F (1, 57) = 4.07, $p < .05$, $\eta^2 = .07$, and prosocial behaviors, F (1, 57) = 4.08, $p < .05$, $\eta^2 = .07$. Simple effect tests revealed significant Relationship differences only in the typical development group, where peer interactions with a friend surpassed peer interactions with a non-friend on these three behaviors. Means, standard deviations, and F values were as follows: for cooperative behaviors, $M = 2.02$, SD = 2.21 with friends; $M = 1.06$, SD = 1.53 with non-friends; F (1, 29) = 13.83, $p < .001$, $\eta^2 = .32$; for sharing, $M = 5.48$, SD = 3.96 with friends; $M = 3.91$, SD = 3.23 with non-friends; F (1, 29) = 6.32, $p < .05$, $\eta^2 = .18$; and for prosocial behavior, $M = 1.77$, SD = 1.05 with friends; $M = 1.23$, SD = 0.50 with non-friends; F (1, 29) = 13.05, $p < .001$, $\eta^2 = .31$. Due to the high standard deviations compared with the means for cooperative behaviors and sharing, additional nonparametric Wilcoxon tests for related samples were performed for these two categories, which mirrored the ANOVA results (cooperative: $Z = 3.09$, $p < .01$; sharing: $Z = 2.18$, $p < .05$).

In addition, a significant main effect for Situation also emerged, F (12, 46) = 20.78, $p < .001$, $\eta^2 = .84$, for all positive social behaviors (see Table 3). Cooperative behaviors, prosocial behaviors, and positive affect were observed at a higher frequency during the construction game than in the other two situations. Also, sharing was more frequent in the drawing task than in the other two situations, and nonverbal behaviors and social conversation were more frequent during drawing and free-play than during construction.

It should be noted that according to Bonferroni correction for multiple comparisons, only ANOVAs for Group and Relationship differences at the level of $p < .01$ were significant. Thus, group differences in social conversation and relationships in sharing should be taken with caution.

Target Children's Play Behaviors

We removed the data from the drawing situation from analysis of the play scale because play behaviors were very infrequent during the drawing task. The 2 (Group) × 2 (Relationship) × 2 (Situation: construction/free-play) MANOVA yielded significant main effects for Group, F (4, 54) = 3.74, $p < .01$, $\eta^2 = .22$, for Relationship, F (4, 54) = 3.37, $p < .05$, $\eta^2 = .20$, and for Situation, F (4, 54) = 187.53, $p < .001$, $\eta^2 = .93$. As seen in Table 2, children with typical development showed a higher frequency of play than the HFASD group only for

Table 2 Means, standard deviations, and main effects for group and for relationship in target children's friendship manifestations on FOS-Y

Scale	Target group		Relationship type		F (1, 57)	
	HFASD ($n = 29$)	Typical ($n = 30$)	Friend ($n = 59$)	Non-friend ($n = 59$)	Group η^2	Relationship η^2
Child's behavior: positive social interaction						
Cooperative						
M	0.97	1.54	1.54	0.97	3.47	11.94***
SD	1.42	1.87	1.91	1.37	0.06	0.17
Sharing						
M	2.86	4.69	4.18	3.38	13.19***	4.45*
SD	2.63	3.59	3.29	2.94	0.19	0.07
Prosocial						
M	1.7	1.52	1.73	1.5	1.38	3.07
SD	1.16	0.77	1	0.94	0.02	0.05
Social conversation						
M	2.57	3.33	3.17	2.73	5.40*	2.42
SD	2.05	2.25	2.14	2.16	0.09	0.04
Nonverbal						
M	9.4	10.93	10.37	9.96	3.49	0.37
SD	4.82	4.99	4.89	4.92	0.06	0
Positive affect						
M	2.86	5.3	4.99	3.18	22.39***	17.61***
SD	2.16	3.95	3.58	2.53	0.28	0.24
Child's behavior: play						
Parallel						
M	1.96	1.67	1.57	2.06	1.42	3.38
SD	1.41	1.31	1.13	1.59	0.02	0.05
Social/collaborative						
M	6.34	6.94	6.95	6.35	2.48	4.03*
SD	2	1.68	1.79	1.96	0.04	0.06
Solitary pretend play						
M	0.86	0.54	0.56	0.84	1.97	2.01
SD	1.35	0.88	0.94	1.36	0.03	0.03
Collaborative pretend play						
M	0.47	1.13	1.04	0.58	6.46*	5.44*
SD	0.86	1.46	1.47	1.03	0.1	0.09
Global dyadic interaction						
Closeness						
M	2.14	2.64	2.99	1.8	7.67**	68.69***
SD	0.97	1.05	1.17	0.86	0.12	0.55
Shared fun						
M	1.98	2.56	2.85	1.68	9.68**	60.43***
SD	1.04	1.11	1.24	0.92	0.15	0.52
Co-engagement						
M	2.89	3.86	3.77	2.97	14.61***	18.02***
SD	1.43	1.57	1.58	1.42	0.2	0.24

Several SDs were higher than their means; therefore, an additional nonparametric Mann–Whitney test for independent samples was performed to verify group differences and Wilcoxon tests for relationship comparisons, which mirrored the ANOVA results

HFASD high-functioning children with autism spectrum disorder, *FOS-Y* Friendship Observation Scale-Young

* $p < .05$, ** $p < .01$, *** $p < .001$

collaborative PP. The table also shows that play behaviors among dyads with a friend were more frequent than among dyads with a non-friend, regarding both social coordinated play and collaborative PP. Overall, children achieved more complex forms of play when interacting with a friend than when interacting with a non-friend. Finally, Situation differences emerged in both parallel play and social coordinated play (see Table 3). Parallel play was more frequent

Table 3 Situation differences for target children's friendship manifestations on friendship observation scale-young

Scale	Situation			F (2, 57) Situation η^2	Paired comparison
	Construction (A)	Drawing (B)	Free-play (C)		
Child's behavior: positive social interaction					
Cooperative[a]					
M	1.96	1.1	0.7	17.64***	A > B > C
SD	2.32	1.63	0.98	0.24	
Sharing					
M	3.39	5.24	2.7	21.45***	B > A = C
SD	2.82	4.41	2.11	0.27	
Prosocial					
M	1.98	1.52	1.35	15.80***	A > B = C
SD	1.32	0.85	0.73	0.22	
Social conversation					
M	1.79	3.85	3.22	31.68***	A < B = C
SD	1.4	3.04	2.01	0.35	
Nonverbal					
M	7.39	11.88	11.23	56.11***	A < B = C
SD	5.21	5.1	4.4	0.5	
Positive affect					
M	5.35	3.33	3.58	20.18***	A > B = C
SD	3.53	2.89	2.75	0.26	
Child's behavior: play					
Parallel[a]					
M	0.25	–	3.4	159.96***	C > A
SD	0.72		2.59	0.74	
Social/collaborative					
M	11.95	–	1.35	774.41***	A > C
SD	3.21		1.73	0.93	
Solitary pretend play[a]					
M	0.54	–	0.87	2.37	ns
SD	1.35		1.66	0.04	
Collaborative pretend play[a]					
M	0.77	–	0.83	0.07	ns
SD	1.64		1.37	0	
Global dyadic interaction					
Closeness					
M	2.32	2.34	2.53	3.52*	C > B = A
SD	1.01	1.05	0.98	0.06	
Shared fun					
M	2.46	2.05	2.29	8.34***	C = A > B
SD	1.16	1.03	1.04	0.13	
Co-engagement					
M	3.65	3.12	3.35	6.22**	A > B
SD	1.56	1.53	1.41	0.1	

* $p < .05$, ** $p < .01$, *** $p < .001$

[a] An additional nonparametric Friedman test for repeated measures multiple comparisons were calculated for these cases in which SDs were higher than their means. Friedman test results mirrored the ANOVA results for all but solitary parallel play, which was more frequent during free-play than in the construction situation

during free-play, and social coordinated play was more frequent during the construction game. Further Friedman non-parametric tests revealed a significant Situation difference for solitary PP too, with a higher frequency shown during free-play than during the construction game (Table 3).

Global Dyadic Dimensions

A 2 × 2 × 3 MANOVA computed for differences in the global evaluations of the dyadic interaction dimensions revealed significant main effects for Group, F (3, 55) = 5.12, $p < .01$, $\eta^2 = .22$, Relationship, F (3, 55) = 23.24, $p < .001$, $\eta^2 = .56$, and Situation, F (6, 52) = 8.26, $p < .001$, $\eta^2 = .49$. As seen in Tables 2 and 3, children with typical development outperformed children with HFASD on all three dyadic dimensions. In addition, for both groups, interactions with a friend were closer, more fun, and more synchronized and co-engaged than interactions with a non-friend. With regard to Situation effects, more closeness was shown during free-play than during drawing or construction, whereas shared fun and co-engagement emerged more during construction and free-play versus drawing.

It should be noted that according to Bonferroni correction for multiple comparisons, only ANOVAs for Group and Relationship differences at the level of $p < .01$ were significant. Thus, group differences in collaborative PP and relationship differences in social coordinated play and in collaborative PP should be taken with caution, as should situation differences in closeness.

Mixed Versus Non-mixed Dyads in HFASD

To compare the interactions of target children with HFASD while interacting in mixed, heterogeneous dyads (with a typical peer, either friend or non-friend) versus interacting in non-mixed, homogenous dyads (with a peer with HFASD, either friend or non-friend), we executed a series of 2 (homogeneity: mixed/non-mixed) × 2 (relationship: friend/non-friend) ANOVAs, with repeated measures on Relationship for all FOS-Y minute-by-minute categories and global dyadic dimensions. Very few significant Homogeneity differences appeared, as follows.

Target Children's Positive Social Interactions Only the ANOVA for cooperative behaviors showed a significant main effect for Homogeneity, F (1, 27) = 4.64, $p < .05$, $\eta^2 = .15$. Children with HFASD in mixed dyads (interacting with a typical peer) demonstrated more frequent cooperative behaviors ($M = 1.61$, SD = 2.10) than children with HFASD in non-mixed dyads who interacted with a peer with HFASD ($M = 0.72$, SD = 1.11).

Target Children's Play Behaviors Only the ANOVA for collaborative PP revealed a significant main effect for Homogeneity, F (1, 27) = 4.33, $p < .05$, $\eta^2 = .14$), showing a higher frequency of collaborative PP in mixed dyads ($M = 0.88$, SD = 0.67) than in non-mixed dyads ($M = 0.17$, SD = 0.22). Also, one significant interaction emerged for homogeneity × relationship, shown for solitary PP, F (1, 27) = 4.88, $p < .05$, $\eta^2 = .15$. Simple effect test for solitary PP revealed a significant difference in the mixed dyads between interactions with a friend ($M = 0.27$, SD = .51) versus interactions with a non-friend ($M = 1.30$, SD = 1.92), F (1, 10) = 4.29, $p < .05$, $\eta^2 = .30$, but no such significant difference emerged in the non-mixed dyads between interactions with a friend ($M = 0.63$, SD = 1.46) versus interactions with a non-friend ($M = 0.52$, SD = 1.14), F (1, 17) = .17, $p > .05$, $\eta^2 = .01$.

Global Dyadic Dimensions Only the ANOVA for co-engagement was significant, F (1, 27) = 3.91, $p < .05$, $\eta^2 = .13$. Mixed dyads ($M = 3.30$, SD = 1.41) were more synchronized than non-mixed dyads ($M = 2.64$, SD = 1.37).

Summary of Examination of Friendship

With regard to group differences in positive social interaction and play, we observed higher frequencies of sharing behaviors, social conversation, positive affect, and collaborative PP during the peer interactions of target children with typical development compared to those of target children with HFASD. The examination of the differences between interactions with friends versus non-friends yielded interesting similarities between the groups. In both groups, interactions with friends were closer, more synchronized, and more fun, with children showing higher frequencies of positive affect and more complex play behaviors, like social coordinated play and collaborative PP, than in interactions with an acquaintance. Only in the typical development group, children playing with their friends were also more cooperative, shared more often, and revealed more frequent prosocial behaviors than children playing with an acquaintance. Results for the three different social situations were more scattered, showing no clear pattern. Within the HFASD group, mixed dyads seem to outperform non-mixed dyads on several important categories, especially cooperative behaviors, collaborative PP, dyadic co-engagement, and synchronicity. Also, children in mixed dyads spent less time in solitary PP when playing with a friend versus a non-friend.

Discussion

The present study aimed to comprehensively investigate several aspects of young friendship in preschoolers with HFASD. The comparative examination between children's interactions with an identified friend and their interactions with an acquaintance aimed to help denote the affective quality unique to friendship relationships and thus to

contribute to the theoretical debate over the capacity of children with HFASD to develop affective bonding as well as intersubjective sharing, which holds significant implications for early intervention (Hobson 2005; Kanner 1943). Another novel contribution of the present study was the young age of the participants. Thus, we explored early friendship's feasibility and characteristics in preschoolers with HFASD through mothers' and teachers' reports and through quantitative analysis of the children's directly observed actual interactions in semi-structured and free-play situations. Importantly, the current findings indicated not only that early friendship in children with HFASD during preschool ages is feasible but also that such friendships are close.

Friendship Feasibility and Characteristics

Mothers' and teachers' reports supported the feasibility of friendship in these young children with HFASD. For each of our participants with HFASD, mothers and teachers identified a same-age and usually same-sex friendship (either with another child with HFASD or a child with typical development) that was reasonably durable (in terms of friendship length) and stable (in terms of friendship consistency). The duration of these friendship dyads of preschoolers with HFASD was reported as an average of about 1 year ($M = 13.00$) according to mothers and an average of 9 months according to teachers. Duration of friendships in preschoolers with typical development was reported as an average of 1.5 years ($M = 18.60$) according to mothers and an average of a little over a year ($M = 13.77$) according to teachers. The gaps between mother and teacher reports attest to the fact that one source alone cannot provide full information about friendship in HFASD, or even in typical development, because each reporter relates to a different setting (home vs. school). Despite these gaps in reported friendship durability, it may be carefully concluded that both reports perceive the identified friendship dyads in both groups as fairly durable. The congruence between teachers' and mothers' reports of stability in meetings in the dyads of both groups supported the previous conclusion.

Durability is an important aspect of friendship. Friendship duration reflects children's ability to maintain continuous dyadic interactions over time. Long-term maintenance of peer relationships requires children to co-regulate their actions with the actions of another child, to resolve conflicts, and to take into consideration the other child's mental perspective (desires, preferences, feelings), thus implying the ability for a rather complex level of socio-cognitive information processing. Indeed, such information processing may be reciprocally related to friendship: For example, Lemerise and Arsenio (2000) emphasized the contribution of children's affective ties (i.e., friendship) to their better and more complex socio-cognitive processing of social information. In light of the neuropsychological profile of children with HFASD, specifically their profound difficulties in social interaction and particularly in coordinating their interactions with another peer and in maintaining those interactions over time, as well as their documented socio-cognitive difficulties in social information processing (e.g., Embregts and van Nieuwenhuijzen 2009), the establishment of a durable friendship lasting at least the better part of a year (according to teachers and mothers) may imply that friendship itself is an advantageous developmental framework that may enable these young children to develop, experience, and practice more complex meta-representational and intersubjective capabilities.

However, any discussion on the possible developmental advantages of young friendship for HFASD is not complete without relating to the quality of such friendships. Peer relationships may be continuous and stable yet of poor quality, especially for children with HFASD, who may demonstrate repetitive interactions based on stereotyped obsessive interests and actions—thus contributing very little to the children's development of representational or intersubjective skills. Indeed, the quality of friendship interactions was our major focus in the current study, which we addressed by comprehensively examining several important empirical comparisons, related to the target child's disability status and identified relationship with the partner, as well as related to the type of social situation and the pair's homogeneity in terms of disability status.

Friendship Quality as Close Affective Ties

The group differences found between the HFASD and typical target children in the current study (beyond differences due to relationship type—friend vs. non-friend) provided support for the neuropsychological profile of autism and for this group's deficits in mastering the multifaceted complexity inherent to building and sustaining social interactions with a peer partner (American Psychiatric Association 2013). Social interactions of typical children significantly surpassed those of children with HFASD on intersubjective sharing and positive affect, as well as on meta-representational skills like collaborative pretend play and maintenance of pragmatically accurate, flowing social conversations. Moreover, the poorer dyadic quality observed in HFASD versus typical development along the dimensions of closeness, shared fun, and co-engagement furnished evidence for the difficulties shown by preschoolers with HFASD in coordinating their interactions with those of a peer.

This peer interaction profile in HFASD, demonstrating fewer complex interactive prosocial behaviors (sharing, expressing positive affect, shared fun) and poorer capabilities

in collaborative play, corroborates former findings based on spontaneous peer interaction in older children with HFASD (e.g., Bauminger et al. 2003; Humphery and Symes 2011; Kasari et al. 2011; Lord and Magill-Evans 1995; Macintosh and Dissanayake 2006). Also, the current difficulties found for conversing with peers correspond with previous findings on spontaneous conversations of children with ASD—both with adults (e.g., Capps et al. 1998; Jones and Schwartz 2009; Nadig et al. 2010; Paul et al. 2009) and with peers (e.g., Lord and Magill-Evans 1995; Macintosh and Dissanayake 2006). Furthermore, observational data on older preadolescents with HFASD also found that friend dyads showed deficient behavioral manifestations of friendship, especially those related to "goal corrected partnership" (Stern 1985), which form the basis for companionship. In Bauminger et al. (2008), during a construction game, friend dyads among preadolescents with HFASD revealed a lower ability to cooperate with peers; fewer reciprocal, contingent interactions; less joint planning and execution; a lower frequency of coordinated play; and a higher frequency of mere parallel play compared to typical friend dyads. More positive affect and rigid conversational skills have also been observed in HFASD friend dyads than typical friend dyads. Dyadic friendship interactions containing a child with HFASD were less enjoyable and close than in typical dyads. These group differences emerging from both current and former studies support clinical as well as theoretical views perceiving peer relationships and interactions as especially challenging for the child with HFASD.

Despite these well-documented group differences in peer interaction, a finer analysis tapping differences in interaction quality between friends and non-friends may provide novel insights into the developmental significance of friendship in HFASD, as a framework for the evolvement and practice of intersubjectivity and co-regulation. Indeed, most interestingly, several of the group differences in peer interaction were cancelled when the examination focused on friends versus non-friends. In particular, children in both groups showed more complex levels of play—manifested as a higher frequency of collaborative pretend play—as well as more positive affect when interacting with a friend than with an acquaintance from the preschool. Even more informative with regard to the importance of friendship in HFASD are the findings related to the dyads' closeness, co-engagement, and shared fun, which were all significantly higher among friends than among acquaintances, regardless of disability status. That is, when interacting with an identified friend, preschoolers with HFASD indeed showed signs of affective bonding as reflected in greater closeness, signs of togetherness as reflected in shared fun, and signs of higher attunement to each other's actions and preferences as reflected in better co-engagement, in comparison to their interactions with a non-friend. As mentioned above, these areas all comprise noticeably deficient domains in HFASD, characterizing these children's socio-communicative deficit. Friendship may facilitate key socio-communicative and intersubjective capacities in these children, as well as providing them with a safe and controllable social setting in which to experience and practice those capacities.

However, the current findings showed that several capabilities were higher among friends than among non-friends only for the typical group. The preschoolers with typical development were more likely to share inner mental states and to use meta-representational behaviors like joint attention and showing behaviors, when interacting with a friend. In a like manner, typical children's interactions with friends were also more cooperative, including better planning of shared activities when performing a task (i.e., construction or drawing) compared to non-friends. Lastly, friendship interactions included more prosocial behaviors such as comforting and helping than non-friend interactions. Thus, even if friendship seems to be an advantageous setting conducive to the development of key social capacities in HFASD, it cannot fully compensate for the socio-communicative deficit, which manifests itself especially in joint attention, sharing, and prosocial capacities.

The current finding, whereby affective peer ties can be identified in HFASD even if they differ somewhat in quality and behavioral manifestations, resembles a major finding that has emerged from research on children's attachment to adults. Attachment with a caregiver—another type of affective tie—has been more extensively examined in ASD than friendship. The data from the attachment literature suggests that about 50 % of children with ASD, most likely those with higher IQs and less severe disabilities, form secure attachments with their caregiver. Yet, these attachments reveal less frequent and more subtle behavioral attachment markers such as looking at, smiling, vocalizing, proximity seeking, and sharing, compared to their counterparts with typical development [see review in Rutgers et al. (2004)]. Likewise, the current outcomes detected the same signifiers of friendship in both typical development and HFASD, but group differences may imply less maturity or more limitations in some of the friendship signifiers among the children with HFASD.

Effects of Social Situation and Peers' Disability Status

Contextual effects regarding the setting for the interaction—semi-structured social situations where children had to construct a model together or draw a shared picture versus non-structured free play—yielded a fairly scattered pattern and no group differences. On the one hand, the free-play situation appeared to provoke more parallel and solitary play than the construction game, which may be

expected because the free-play situation required children to create their own ideas for shared play whereas the construction task provided direction to build a shared model and roll the marbles down. On the other hand, ratings of closeness were highest during the free-play context, and shared fun was equally high in the free-play and construction contexts, probably due to the excitement of the marbles rolling down the maze. Also, free-play and drawing situations seemed to elicit more nonverbal and conversational behavior in the children than the construction game, but the construction task elicited more cooperative and prosocial behaviors as well as higher frequencies of positive affect than free-play or drawing situations. Thus, altogether, the free-play context seems to be the most challenging situation in terms of play organization and evocation but nevertheless has other benefits such as the elicitation of closeness.

Finally, with regard to mixed-dyads versus non-mixed-dyads in the HFASD group only, the comparison surprisingly yielded very few significant differences. Interaction with a typical peer seemed to offer several benefits over interaction with a peer having HFASD. Specifically, the interaction with typical peers appeared to elicit more cooperative behavior and a better synchronized interaction as well as more complex levels of play as demonstrated in collaborative pretend play. Also, the finding that solitary pretend play occurred less often in interaction with a friend (vs. a non-friend) emerged only if the friend was a typical child (i.e., in mixed dyads), showing some benefit for the typical friend in enhancing social involvement in play activities for the child with HFASD.

Study Limitations, Implications, and Directions for Future Research

The current study has several limitations that should be noted. First, the sample was selective in two major ways. One, it included only high-functioning participants along the spectrum—those who do not reveal an intellectual deficit (IQ $>$ 70), which is a subgroup that, according to recent prevalence reports, comprises 62 % of individuals with ASD (Centers for Disease Control and Prevention 2012). Two, the sample comprised only those children with HFASD who had an identified friend, so generalizability is possible only to this subgroup of children. Indeed, uncovering this subgroup and its unique needs and abilities is important to show that friendship is feasible in such young children with HFASD, but future studies would do well to explore the degree to which these findings can be applied to a broader range of functioning levels in ASD and to distinguish the characteristics of children with HFASD who do not reveal an identified friendship. Also, the level of exposure to both peers with HFASD and/or with typical development varied greatly among the participants with HFASD due to their school settings; hence, based on the current outcomes, it is difficult to fully speculate about the children's preferences to form friendship with a child with HFASD or a child with typical development, beyond close proximity and exposure level.

Second, even if the current sample size was reasonable considering the extent of multiple examinations for each child (group, relationship, situation, homogeneity), a larger sample would be more informative, especially regarding the differences between mixed and non-mixed interactions and friend and non-friend relationships. Yet, interestingly, the target child's disability status emerged as far less important in this study than the partner's friend/non-friend status.

Third, despite the relatively comprehensive procedure used here to evaluate friendship across semi-structured and non-structured social settings and across multiple levels of analysis (target child and dyadic qualities), especially considering the participants' number, several expansions are worthwhile in future research. To provide a fuller description of these children's friendships and to validate the current laboratory findings in real-life social situations, a more detailed coding schema should relate to children's initiations versus response behaviors; autistic behaviors and mannerisms should be tapped; and friendship should be evaluated in natural school settings (e.g., recess).

Fourth, even though our results for group or relationship differences were theoretically driven and supported the neuropsychological profile of autism, as discussed above, and although our statistical procedure progressed from multivariate to univariate analyses, thus reducing the likelihood of Type 1 error due to multiple comparisons, some risk still remains. Thus, based on Bonferroni correction, special caution should be taken in interpretation of the few findings at the $p < .05$, and follow-up studies are needed to verify the current results.

On the whole, despite these shortcomings, this study revealed the possible developmental advantages of friendship for preschoolers with HFASD. Friendships among children with ASD are feasible, durable, and offer some of the same benefits afforded to typical children. We do not claim that friendship is intact in HFASD or similar in quality to friendship in typical development, but we would like to emphasize its possible unique contribution to the enhancement and experience of key socio-communicative and intersubjective capacities. The present outcomes hold significant implication for early intervention because friendship is rarely targeted in such interventions. Most treatments today promote mainly social and play skills, but the current findings suggest that they should focus more on young children's abilities to develop and maintain relationships with their peers. More specifically, the type of activities between friends needs to be carefully designed

because some may possibly scaffold the development of friendship while others may increase solitary play. In like manner, exposure to typical peers seems to hold importance to the development of more complex social interactive and play behaviors and less solitary play. Facilitation of friendship in early intervention may perhaps lead to reduced rates of comorbid affective disorders such as depression and anxiety at older ages (e.g., Szatmari and McConnell 2011), which may emerge partly due to a lack of satisfactory peer relations.

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